

**COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER DIVISION
ELLEN GILINSKY, Ph.D.
DIRECTOR**

P.O.BOX 1105

Richmond, VA 23218

Subject: TMDL Guidance Memo No. 08- . Implementing guidance for monitoring of point sources using low-level PCB method 1668A for TMDL development

To: Regional Directors

From: Ellen Gilinsky, Ph.D., Director

Date: *(Enter current date)*

Copies: James Golden, Rick Weeks, Regional Water Permit Managers and Watershed Staff

Summary:

This guidance establishes procedures for implementing point source monitoring of polychlorinated biphenyls (PCBs) in support of Total Maximum Daily Loads (TMDL) development. This monitoring applies to these categories of point sources discharging to PCB impaired waters: municipal (major and minor) and industrial wastewater facilities; and industrial storm water discharges, whether operating under an individual or general storm water permit. PCB monitoring entails sample collection and low-level analysis using EPA Method 1668A to determine individual PCB congener concentrations. This action replaces the current method that is unable to detect low-level PCBs against the Virginia water quality criterion for total PCBs.

Electronic Copy:

An electronic copy of this guidance in PDF format is available for staff internally on DEQNET, and for the general public on DEQ's website at: <http://www.deq.virginia.gov>.

Contact information:

For TMDL information, please contact Charles Martin, Watershed Program Manager, at (804) 698-4462 or at chmartin@deq.virginia.gov or information regarding water permits, please contact Fred Cunningham at (804) 698-4182 or at fkunningham@deq.virginia.gov.

Disclaimer:

Guidance documents are developed as guidance and, as such, set forth presumptive operating procedures for the Agency. Guidance documents do not establish or affect legal rights or obligations, do not establish a binding norm, and are not determinative of the issues addressed. However, this document does not mandate any particular method nor does it prohibit any particular method for the analysis of data, establishment of a wasteload allocation, or establishment of a permit limit. If alternative proposals are made, such proposals should be reviewed and accepted or denied based on their technical adequacy and compliance with appropriate laws and regulations.

Monitoring of Point Sources Using Low-Level PCB Method 1668A for TMDL Development

I. Introduction

The purpose of this guidance is to establish procedures for implementing point source monitoring of polychlorinated biphenyls (PCBs) in support of Total Maximum Daily Loads (TMDLs) development. This monitoring may apply to these categories of point source discharges: 1) municipal (major and minor) and industrial wastewater facilities, and 2) industrial storm water discharges, whether operating under an individual or general storm water permit. Facilities will be notified by the DEQ regional office if low-level PCB monitoring is requested. The selection of facilities to conduct monitoring is determined by regional permitting and TMDL staff and is based upon the criteria identified herein.

PCB monitoring entails sample collection and low-level analysis using the Environmental Protection Agency's (EPA) Method 1668, Revision A (1668A) (EPA 1999a) to determine individual PCB congener concentrations. Implementation of this procedure will result in the collection of low-level data for source-specific PCB effluent concentrations to meet the required elements of the TMDL submittal by identifying sources and to quantify the existing loads for TMDL development. While the low-level PCB Method 1668A has not yet been promulgated by EPA, they recommend its use for data generated in support of TMDL development. Therefore, data generated under this guidance should not be used for compliance purposes.

This guidance was developed with assistance of a PCB Point Source Monitoring Technical Advisory Committee (TAC). The TAC consisted of representatives from both the regulated community and environmental groups throughout the state. The PCB point source monitoring approach being adopted is similar to those used in New York (Panero *et al.*, 2005) (<http://www.nyas.org/programs/harbor.asp>), Delaware and New Jersey (DRBC 1998) (<http://www.state.nj.us/drbc/regs/pcb-new.pdf>) and employed in the Tidal Potomac PCB TMDL developed by EPA in cooperation with District of Columbia, Maryland, and Virginia (Haywood and Buchanan 2007).

II. Background

In 2004, the Virginia Department of Health lowered the trigger value for fish consumption advisories for PCBs from 600 ppb to 50 ppb. The following year, the Virginia Department of Environmental Quality (DEQ) published the "PCB Strategy for the Commonwealth of Virginia" (www.deq.virginia.gov/fishtissue/pcbstrategy.html). This document describes the regulatory framework and state initiatives to address PCB impaired waterbodies due primarily to high PCB levels in fish tissue.

III. Authority

Development of a PCB TMDL requires consideration of the Virginia water quality criterion for Total PCBs (9 VAC 25-260-140) to protect the "fishable" designated use (9VAC 25-260-10). The current PCB compliance Method 608 (40 CFR Part 136) is incapable of meeting these regulatory requirements as the method detection level is well above the water quality criterion. In order to characterize PCB loadings for TMDL development, DEQ is implementing low-level PCB monitoring as recommended by EPA (1999a) (Appendix A). The monitoring will be

coordinated through the Virginia Pollutant Discharge Elimination System (VPDES) permit and TMDL programs.

IV. Definitions

“Composite Sample” as used in this guidance is a combination of individual samples of water or wastewater taken in proportion to flow or time which ensures that a representative sample is collected. Composites most often represent samples collected over 24 hours.

“Congener” is a chemical compound in the polychlorinated biphenyls (PCB) category and is a derivative or a compound in the same group. In this case, there are 209 congeners of PCBs.

“Industrial storm water” as referenced by the VPDES Permit Regulation (9VAC25-151-10) means storm water runoff associated with the definition of “storm water discharge associated with industrial activity.”

“Manual composite” as used in this guidance is a “composite sample” which consists of individual grab samples taken during a time sequence and final compositing of the individual grabs occurring within the laboratory and not at the facility where the samples were collected.

“Method 1668A” is an analytical method developed by the EPA Office of Water’s Office of Science and Technology to determine chlorinated biphenyl congeners in environmental samples by isotope dilution and internal standard high resolution gas chromatography/high resolution mass spectrometry (HRGC/HRMS). This analytical method has been recommended by USEPA for data generation related to TMDL development.

“No exposure” as referenced by VPDES Permit Regulation (9VAC25-151) means all industrial materials or activities are protected by a storm-resistant shelter to prevent exposure to rain, snow, snowmelt, and/or runoff.

“PCB” and PCBs as referenced in EPA 40 CFR 761 means any chemical substance that is limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances which contains such substance. They are a class of organic compounds with 1 to 10 chlorine atoms attached to biphenyl and a general chemical formula of $C_{12}H_{10-x}Cl_x$ (where $x = 1-10$). For purposes of this Guidance, total PCBs is the summation of all detected PCB congeners (refer to Appendix D - Attachment 3 for use of qualifiers).

“pg/L” refers to picograms per liter (pg/L) and corresponds to parts per quadrillion (ppq) (1.0×10^{-12}) (EPA 1999a).

"Publicly owned treatment works" or "POTW" as defined by the VPDES Permit Regulation ([9VAC25-31-10](#)) means a treatment works as defined by §212 of the Clean Water Act, which is owned by a state or municipality (as defined by §502(4) of the Act). This definition includes any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage or industrial wastes of a liquid nature. It also includes sewers, pipes and other conveyances only if they convey wastewater to a POTW treatment plant. The term also means the municipality as defined in §502(4) of the Act, which has jurisdiction over the indirect

discharges to and the discharges from such a treatment works.

"Process wastewater" referenced in VPDES Permit Regulation ([9VAC25-31-10](#)) means any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product.

"SIC" means the Standard Industrial Classification Code or Industrial Grouping from the U.S. Office of Management and Budget Standard Industrial Classification Manual, 1987 Edition. It is used to describe the specific industrial activities occurring at a facility to determine whether or not the facility is required to be permitted under the regulations.

"Storm event" as used by the general permit monitoring instructions (9VAC25-151-70-A.2.b) refers to an event that is greater than 0.1 inch in magnitude (defined as a "measurable" event), providing the interval from the preceding measurable storm is at least 72 hours. In this guidance, high flow events or wet conditions are storm events. To be consistent with monitoring requirements at 9 VAC 25-151-70-A.1.a(2), snow melt samples are not to be considered.

"Storm water" referenced in VPDES Permit Regulation ([9VAC25-31-10](#)) means storm water runoff, snow melt runoff, and surface runoff and drainage.

V. Procedure

The objective of this guidance is to facilitate the generation of low-level PCB data for TMDL development as well as identify and quantify sources of PCBs as required (EPA 1992, 1999b). Monitoring and data analysis is performed using EPA approved procedures for total PCBs on a congener basis (EPA 1999a).

A. Facilities Identified for Monitoring

VPDES permitted facilities discharging into PCB impaired waters and subject to this guidance include:

- all major municipals (POTWs) (1.0 MGD design capacity and above, including combined sewer overflows or CSOs),
- minor municipals (less than 1.0 MGD),
- industrial wastewater facilities, and
- industrial storm water discharges under individual or general permits.

Certain exceptions may be considered:

- For minor municipal facilities, the permittee shall provide adequate documentation that the facility is not a potential source of PCBs. This is based on a certified report by the owner and may include site inspection by DEQ staff.
- Storm water discharge is to a POTW or through a CSO, or if the facility meets the definition of "no exposure" under 9 VAC 25-151-70.
- A representative outfall may be sampled by the permittee, if a facility has two or more outfalls that discharge substantially identical effluents as specified in 9 VAC 25-151-70.
- An industrial facility certifies that PCBs were never present on the site.
- Final determination will be made on a case-by-case basis with coordination between the regional TMDL and permit staff.

- This guidance does not apply to municipal separate storm water systems permitted by DCR.

Specific types of industrial or commercial operations are more likely than others to have a discharge that includes PCBs. Therefore, industrial activities with primary or secondary Standard Industrial Classification (“SIC”) codes identified in Table 1 are subject to this monitoring guidance. Other industrial facilities may be identified for monitoring based on additional information or recommendations of DEQ technical staff.

Table 1. Industrial Facilities by SIC Code Subject to PCB Monitoring Guidance.

SIC Code	Code Name Facility
26 & 27	Paper and Allied Products
30	Rubber and Misc. Plastics
33	Primary Metal Industries
34	Fabricated Metal Products
37	Transportation Equipment
49	Electrical, Gas and Sanitary Services
5093	Scrap recycling
1221 & 1222	Bituminous Coal

Once a PCB impaired segment appears on the TMDL development schedule, the regional TMDL coordinator is responsible for notifying the facility of data needs. If data for TMDL source characterization are not available through this effort, DEQ may request data by letter or amend a VPDES permit with special conditions (Appendix B).

B. Monitoring Frequency

Monitoring frequency for facilities described in Section A is outlined in Table 2. For load characterization, both base flow (dry) and storm or high flow event (wet) sampling are recommended as described in Appendix C unless stated otherwise.

Table 2. Type of facility and sample frequency recommended.

VPDES Facility				
Municipals		Industrials		
Major ≥ 1 MGD	Minor < 1 MGD	Process wastewater only	Process wastewater with storm water	Storm water only
2 wet + 2 dry	1 wet + 1 dry	2 samples (storm event sampling not required)	1 dry + 1 wet	2 wet

Dischargers subject to the monitoring guidance shall begin monitoring within one year of receipt of DEQ notification and conclude the monitoring within two years of receipt of the notification from DEQ. Samples previously collected and analyzed, may be used in satisfying the total number of samples required provided monitoring and analysis are conducted in accordance with

Sections C and D of this guidance.

C. Sample Collection and Analytical Requirements

The analytical approach used with this guidance is EPA Method 1668A, capable of detecting low-level concentrations for all 209 PCB congeners. Individual congeners are summed to form total PCB. Based on the sensitivity of this high resolution gas chromatography/high resolution mass spectrometry (HRGC/HRMS), it is necessary to follow ultra-clean sample collection and handling techniques. Specific guidance for sample collection is provided in Appendix C. The application of these procedures ensures consistency between sampling events and among participants collecting samples.

Some facilities have expressed an interest in monitoring their water supply intake in order to demonstrate that the wastewater treatment plant (WWTP) is not an actual source of PCBs. Influent and effluent data from WWTPs in Washington State indicate that the treatment plants effectively remove greater than 95% of the PCBs in the influent to the plant. A WWTP therefore cannot demonstrate that they are not a source of PCBs by showing that the PCBs in the intake and in the effluent are of the same order of magnitude. Any effort to make such a demonstration must include intake, WWTP influent and effluent analysis along with a comparison of the individual congeners in each. Sample collection and analysis at all three locations should be consistent with this guidance and procedures with particular attention to this section and PCB Reporting Requirements (Section E) below.

Method 1668A is performance based which allows analytical laboratories to improve upon the method capabilities (EPA 1999a). Appendix D contains the specified laboratory requirements. Included are the congener-specific Estimated Method Detection Levels (EMDLs) and the Minimum Level (ML) or concentration(s) at which the congeners are to be reported. Analytical consistency along with the ability to meet quality control requirements is essential among participating laboratories.

D. Analytical Laboratories

While the agency cannot recommend any testing laboratory, a list of laboratories that conduct testing and employ equipment capable of performing EPA Method 1668A will be on file and posted on the DEQ web site. However, the laboratory must be capable of meeting the EMDLs and MLs specified in Appendix D (<http://www.deq.state.va.us/tmdl/pcb.html>).

E. PCB Reporting Requirements

Data should be delivered to DEQ in two electronic data formats. Format and files are described in Appendix E and are available for download from the DEQ TMDL website (<http://www.deq.state.va.us/tmdl/pcb.html>).

F. References

Delaware River Basin Commission (DRBC). 1998. Study of the loadings of polychlorinated biphenyls from tributaries and point sources discharging to the tidal Delaware River. Estuary Toxics Management Program, DRBC West Trenton, New Jersey. June.

Environmental Protection Agency (EPA). 1999a. Method 1668, Revision A: Chlorinated Biphenyl Congeners in Water, Soil, Sediment and Tissue by HRGC/HRMS, EPA-821-R-00-002, December 1999. *(with corrections and changes through August 20, 2003)*

Environmental Protection Agency (EPA). 1999b. Draft Guidance for Water Quality-based Decisions: The TMDL Process (Second Edition). EPA 841-D-99-001.

Environmental Protection Agency (EPA). 1992. Reviewing TMDLs Under Existing Regulations Issues in 1992. <http://www.epa.gov/owow/tmdl/guidance/final52002.html>

Haywood, H. C. and C. Buchanan. 2007. Total maximum daily loads of polychlorinated biphenyls (PCBs) for tidal portions of the Potomac and Anacostia rivers in the District of Columbia, Maryland, and Virginia. Interstate Commission on the Potomac River Basin. ICPRB Report 07-7. Rockville, MD. October 2007.

Panero, M, S Boehme and G Munoz. 2005. Pollution Prevention and Management Strategies for Polychlorinated Biphenyls in the New York/New Jersey Harbor. A Report from the Harbor Consortium of the New York Academy of Sciences, NYAS, February, 2005.

VI. Appendices

- A. NPDES Permitting Authorities have some discretion in specifying methods more sensitive than 40 CFR Part 136. Personal communication from Brian P. Trulear, NPDES Program Manager, EPA Region 3. June 8, 2007.
- B. Data Notification Needs
- C. Sample Collection Methods for Effluent and Storm Water
- D. Analytical Quality Control Requirements
- E. Reporting Requirements for Analytical (PCB) Data Generated Using EPA Method 1668A